State Library of Queensland Digitisation Toolkit Information Guide 9: Scanning and Capture Guide for image-based material

Introduction

The purpose of this guide is to provide in-depth step-by-step instruction for scanning and capturing heritage materials.

While the term "digitisation" can encompass a broad range, for the purposes of this guide, reference will be made specifically to pictorial collections.

Also, as there are countless varieties of both software and hardware available, this guide does not promote any particular brand but focuses on the minimum expected capabilities in order to create digital files that adhere to State Library of Queensland standards and international best practices. Screen shots are for illustrative purposes only and may differ to the software/hardware used by your organisation.

Minimum Technical Specification for Digitisation Equipment

The following is the minimum capability of any digitisation equipment. Anything that exceeds these minimum standards will be ideal. Reference notes and explanations are at the bottom.

Scanner

Size	A4
Resolution[1]	700 ppi[2] for flat objects, 2700 ppi for slides
Interface	USB 2

Camera

Type	DSLR[3]
Resolution	24 Megapixels[4]
Sensor	DX[5]
Lens	50mm[6]

1. The resolution of a scanner is expressed as the number of pixels within an inch (2.54cm) that it is capable of producing. However, many devices have an optical and an interpolated maximum resolution. Optical is the maximum or true resolution of the scanning hardware. Interpolated is the ability of the scanning software to build in extra pixels artificially. Therefore, optical resolution is the only figure that should be looked at when making decisions on equipment.

2. Pixels per inch. This is the number of individual pixels within each inch (2.54 cm) that the scanner is capable of creating to form the digital image. The more pixels, the greater the resolution and the better the clarity and detail in the scan. Some manufacturers will use the term dots per inch (dpi). While dpi is specifically a printing resolution, when used to express a scanner's capability, they are referring to the pixels per inch.

3. Digital Single Lens Reflex. These cameras are based on the traditional 35mm film, Single Lens Reflex (SLR) system but utilise a digital sensor instead of film. The image through the lens is projected via a movable mirror to the viewfinder. When the capture is taken, the mirror moves out of the way briefly so that the image through the lens is now projected onto the image sensor. The size of the sensor allows a greater amount of detail to be captured than the equivalent in a smaller or compact camera. These cameras allow a wide amount of customisation and the lenses can be changed to suit different purposes.

4. A Megapixel is 1 million pixels. Most digital cameras will have a resolution expressed in Megapixels and is calculated by the size of the sensor and the number of pixels within that sensor. E.g. a camera sensor is 6000 pixels wide by 4000 pixels high (6000 x 4000 = 24 million *or* 24 megapixels)

5. DSLR cameras will usually have two types of sensor, a full frame or cropped. Some manufactures refer to the full frame as an "FX" while the cropped sensor can also be called a "DX", "APS-C" or "Micro 4/3". Full frame sensors are generally better but are also more expensive. A cropped sensor camera with good resolution will still give good results.

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6. A 50mm lens will give a reasonably flat image with acceptable depth of field. Smaller numbered lenses (35mm, 24mm, etc.) are wide angle and will distort the image captured. Larger lenses (80mm, 100mm, etc.) are telephoto and will also give a flat image, but maybe limited in their ability to focus on close detail.

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Scanning

A scanner is a device that uses a light source and image sensor to digitise flat objects. Some will also scan transparent film such as slides and negatives.

Most scanners come with software that will control the parameters of the device. While some scanners may also give you the option of scanning directly into your image editing software, we recommend that this be conducted using the supplied program. The images may then be opened and adjusted in the image editing software separately.

Step 1
Place the item being scanned face down on the glass bed

Step 2
Close the lid of the scanner and open the scanning software

Step 3
Click on Preview (may be labelled with another name such as Prescan)

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Step 4

Adjust the selection box just past the edges of the photograph or material. Do not use the selection box to crop the image, this will be done later.
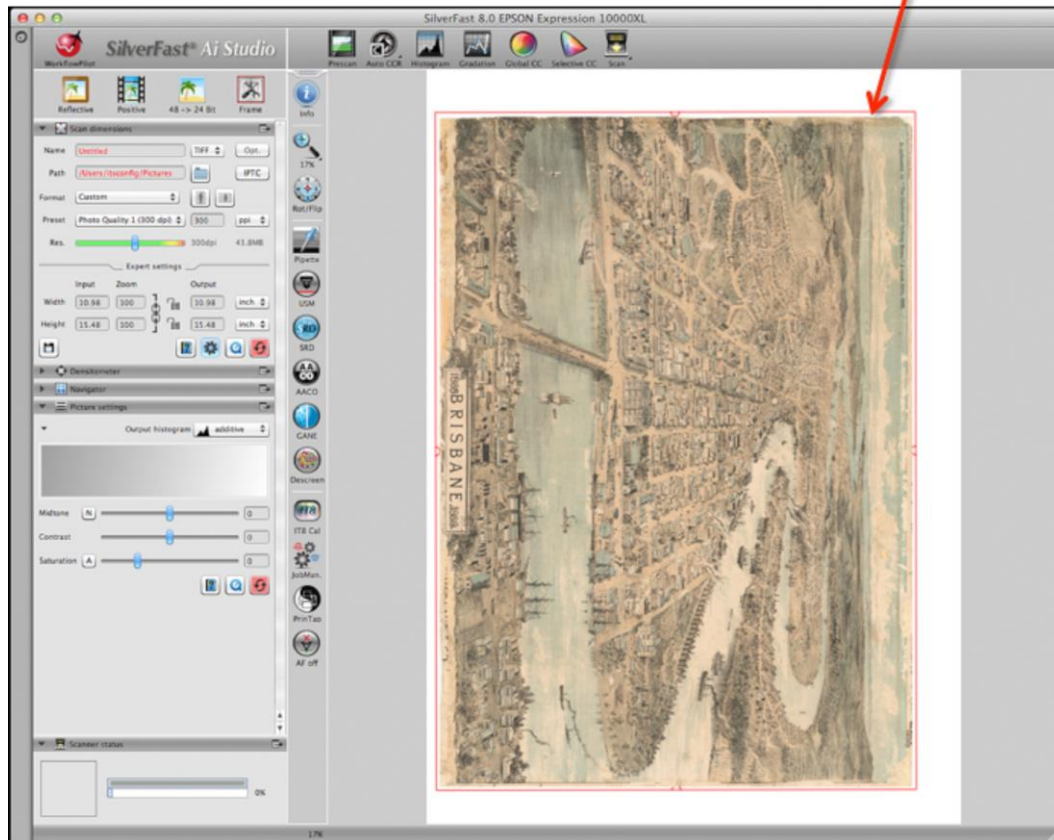
Step 5

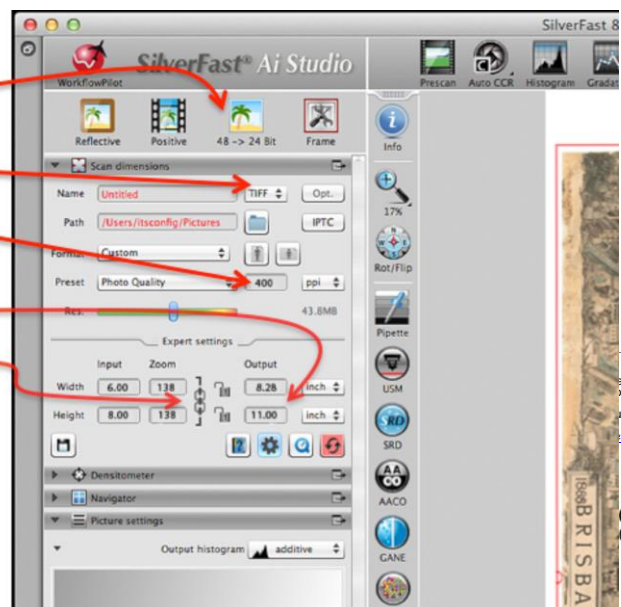Set the scanning parameters to the following:

Scan type is set to colour

File type is set to TIFF

Resolution is set to 400 ppi

Ouput size is set to 11 inches for longest side (or 30cm in metric)

As long as the two are linked changing one measurement will automatically adjust the other to the same proportions

Step 6
Click on scan button to digitise image

You will be asked to supply a file name and a location to save the file. It is good practise to save all files belonging to a collection into a folder or directory that has been created for that collection, even if it only has one image.

Capture

A capture device is generally a digital camera. The lens of the camera focuses a picture onto an image sensor that converts the scene into pixels of digital information.

Digital cameras can be found on many devices from phones and tablets through to high end, professional Digital Single Lens Reflex (DSLR) equipment.

When using a camera to capture a scene or event, much depends on the photographer's eye as to composition, focus and depth of field. However, when using such equipment to capture copies of pictorial content, some basic principles can be applied.

Step 1
Make sure the original item is evenly lit (shouldn't be an issue if using a copy stand with lights)

Natural Light

Artificial Light
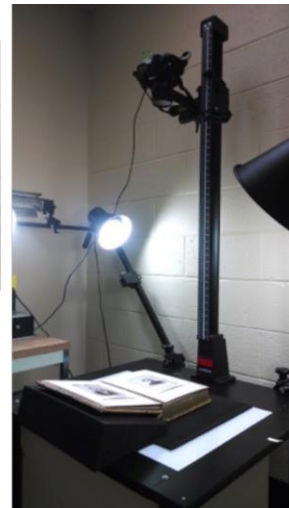
Copy Stand

Step 2
Set camera above original using copy stand or tripod so that camera back is level to original
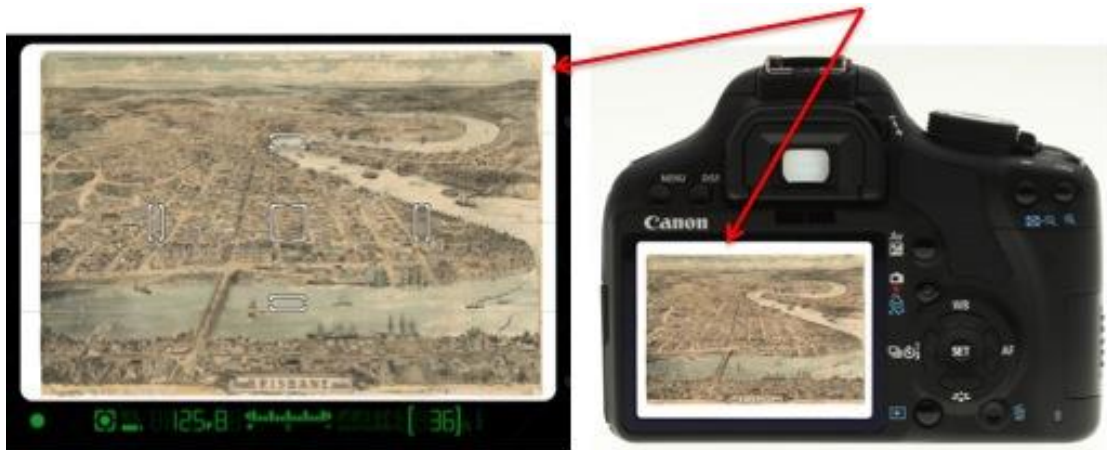
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Step 3

Step 3
Adjust the height and focus so that there is a small amount of white area around original when viewed through viewfinder or screen on back of camera.

Step 4
Set the camera to manual setting (M) and adjust exposure using a combination of shutter speed and aperture (may need to take some test shots to confirm correct exposure)

Exposure Correct

Over exposed by 1 stop

Under exposed by 1 stop

Step 5
Select the white balance by pushing the WB button on the camera and then select the option that matches the lighting type (daylight, tungsten, fluorescent, etc.).

AWB Auto

☀ Daylight

☁ Cloudy

🏠 Shade

💡 Tungsten / Incandescent

Flourescent

⚡ Flash

Custom

Step 6
Set camera to RAW (if no RAW setting, highest quality JPEG as a minimum)

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Step 7
Set camera to self-timer or use a cable release

Capture image by pressing the shutter release button on camera or cable release

Now that you have scanned or captured your images, the next step is to review and finalise the images for archival storage, using image editing software. This will be explained in the next section.

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Image Editing Software Tasks

Most image editing software has been designed to cater for a broad range of users such as photographers, graphic artists, filmmakers, etc. As a result there are many tools and capabilities within the software that can make dramatic adjustments to an image.

For the adjustment of heritage-based images, a very minimalistic approach should be adopted. For instance, adjustments to brightness and contrast should only be made so as to enhance the detail in the image while still maintaining the look of the original. The same rule applies to corrections in colour. These should only be applied so that the digital copy matches the colour of the original image. Digital copies may be cropped so long as this does not interfere with the integrity of the object – e.g. white borders on a photograph or mount board that adds no aesthetic or historical value to the image.

The following guides are in two sections, Scanned Images and Captured Images:

Section 1 (Scanned Images)

Step 1
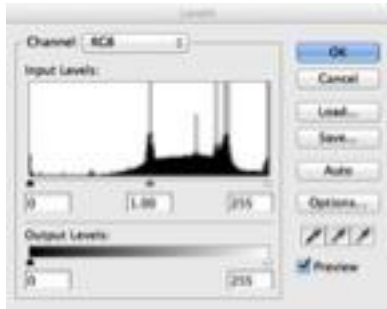Open image in editing software
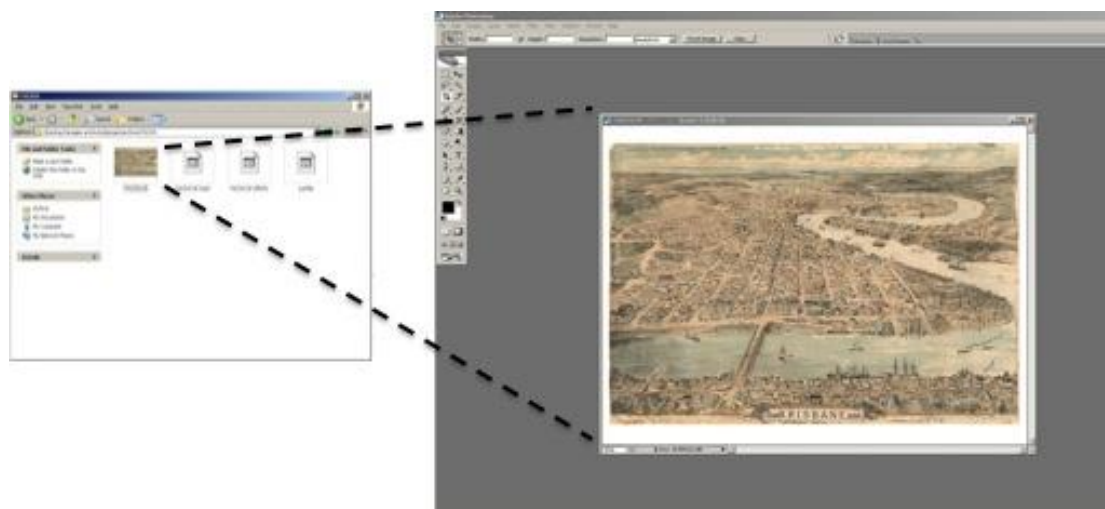
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Step 2

Adjust the clarity of the image. Depending on the software, this is done using "Levels" or "Brightness and Contrast" controls.

As Scanned   After Adjustment

Step 2a (colour corrections)

Colour images will sometimes require corrections to match the original. This can be achieved using Colour Balance or Colour Hue controls.

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Original Image   **Scanned image requiring colour correction**

Step 3
When the image was scanned, the selection box should have been set to include a small amount of area around original. We can now crop this out of the image using the Crop tool.
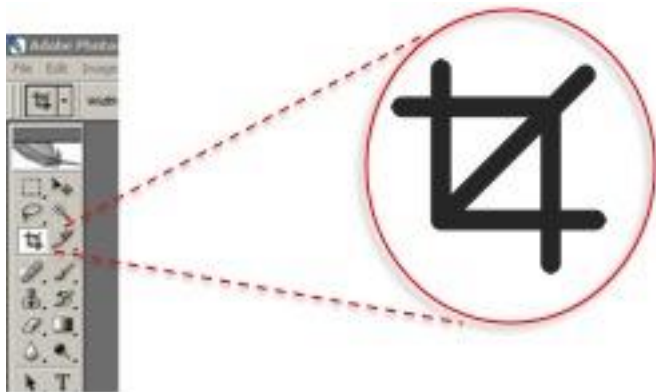
Area around original included when scanned, being cropped

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Step 4

When the original was scanned, the output settings should have been set to produce a digital image larger than needed to allow for any cropping and adjustments. Now those have been performed, we can resize to our archival standard.

The image should be resized to 4000 pixels on the longest side.

The resolution should be set to 400 pixels per inch (ppi)

The resulting file size or pixel dimensions should be smaller. If not, you may have to rescan image at higher resolution.

Step 5

Image can now be saved as the archival master tiff.

Step 6 (Derivative Creation)

After saving the archival master tiff, but before closing the image, change the image size again, this time to 100 ppi, giving 1000 pixels on the longest side.

Step 7 (Derivative Creation)

Save this as a jpeg with the least amount of compression into a different folder. (If possible, saving the jpegs to a totally different drive would be better so as to keep everything separate.)

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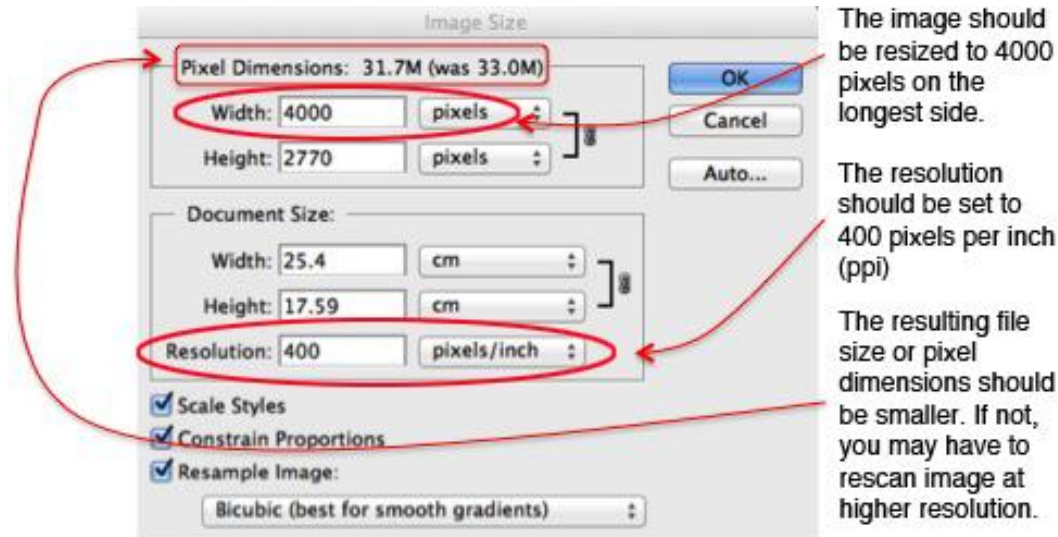
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Section 2 (Captured Images)

The information in this section assumes that the images have been captured in RAW format. If the images have been captured in another format such as JPEG or TIFF, they should be treated the same as scanned images in Section 1.

Step 1

Open the captured RAW image in your editing software. Depending on the software used, you will see a number of tools available to correct or enhance the RAW file. Be aware that some software needs to be updated so it recognises the files coming from your camera. This is particularly so if you have a new camera but much older software.
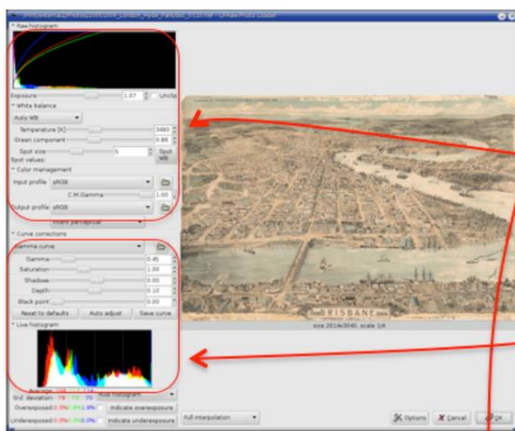
There are numerous corrections that can be performed in the RAW viewer. The main ones to concentrate on are the colour corrections found under **White Balance**

And the tonal adjustments found under **Exposure or Gama corrections.**

RAW Image viewer in GiMP
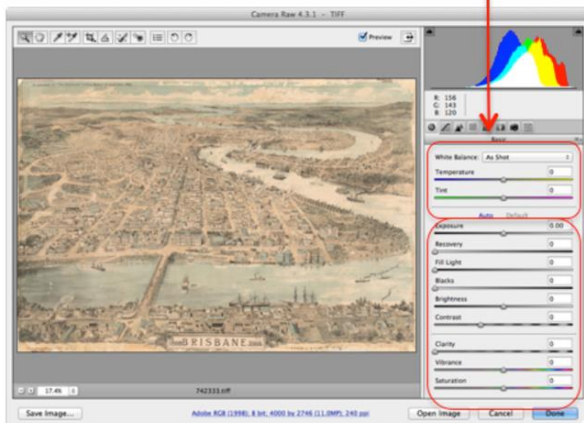
RAW Image viewer in Photoshop

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Other tools can be used at this time such as cropping, straightening, rotating, spot removal, etc. However, these are probably best performed in the editing software itself, once the above corrections are done and the result saved.

Step 2
Once corrections are completed, you can either save the image as a TIFF or open it in your editing software to make any final adjustments. From this point, the image file should be treated the same as a scanned image and any necessary adjustments made as outlined in Section 1

Step 3 (Derivative Creation)
Derivatives can then be created as outlined in Section 1, steps 6 & 7 on page 13 of this guide.

Saving

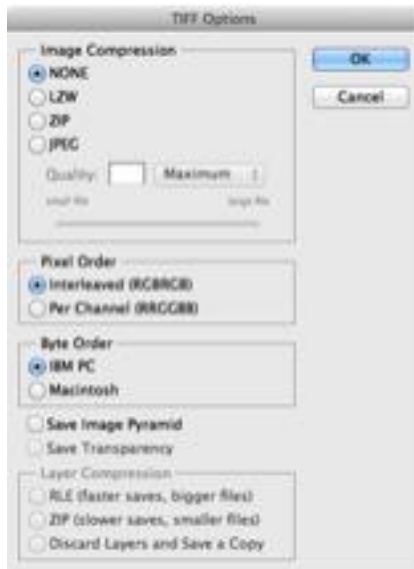Usually, the file format chosen to save an image is selected at the time of scanning or capture. However, it is important that the digital image being kept as the archive master is saved at a high resolution and in an uncompressed format such as TIFF.

Some image editing software includes options for compressing what are normally uncompressed file types such as TIFFs. It is important that Image Compression is set to NONE.

All other options can be left at their default settings.

Derivatives used for access through tools such as a local database or web page may be saved in a smaller resolution and in a compressed format like JPEG. However, these should be saved with the least amount of compression used. This will be expressed as either a numerical value (10 or above being the best), or as a quality setting (use "best" or "maximum" in this case).

It is important that any derivatives created be saved in a separate location to the archival masters. Some organisations such as the State Library of Queensland, choose to save these to a different server location or hard drive but even small organisations are encouraged to adopt the same approach.

In its simplest form of storage, this could be two external hard drives, one for Archival Master TIFFs, the other for the derivatives.

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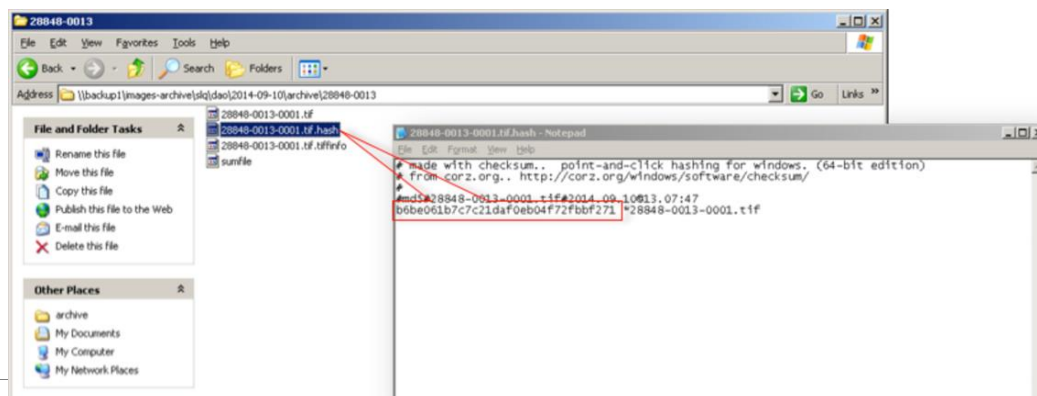© SLQ 2017. V1 last updated Jan 2017.

A better solution is the use of Network Attached Storage (NAS) drives. These contain multiple hard drives (2 or more) that are backed up across each other. If one drive fails, the information is still intact.

Partitions can be created within the NAS drive to keep the Archival Master Files separate from the derivatives. However, in this case it is important that the Archival Master Partition is made secure with only select individuals having access.

Of course, all good digital archives should be backed up regularly. Therefore a second, complete copy of at least the Archive Master files should be created on another hard drive or NAS. Ideally, this should be stored at an offsite location.

An alternate solution would be to use a Cloud storage service. With this option the backup is uploaded to the Cloud via the Internet and the service provider delivers a measure of support to maintain the integrity of the files. However, these services are provided on a subscription basis and the cost usually increases with the amount of storage needed. A good internet connection is also vital.

Another consideration in order to keep track of the security and integrity of the Archival Master files is the use of Checksums, which have been widely adopted as an international standard for digital archives. A Checksum is a numerical code or metadata that is created by a simple program when the original master file is saved. Over time, some data can become corrupted, but by using a checksum this can be detected early, before the information is irretrievably lost. By comparing the numerical values between the original and the backup, it can be quickly determined if the file integrity is intact. If the checksums don't match, you know there is a problem.

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Additional Resources:

State Library of Queensland, Digitisation Toolkit.
http://www.slq.qld.gov.au/about-us/projects-and-partnerships/distributed-collection-of-queensland-memory/digitisation-toolkit

State Library of Queensland, Digital Standard 2
http://www.slq.qld.gov.au/__data/assets/pdf_file/0009/139815/digital_standards_2.pdf

Checksum Utility for Windows
http://corz.org/windows/software/checksum/

Photoshop CS2 (old version released 2004)
http://www.techspot.com/downloads/3689-adobe-photoshop-cs2.html

GiMP, Free, multi-platform, Image Editing Software
http://www.gimp.org

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